

ARROWSMITH

1854-1954

1954-1979



1854 - 1954
1954 - 1979

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1854-1954

1954-1979

First edition 1955

Second edition 1979

Made and printed in Great Britain by
J. W. Arrowsmith Ltd., Winterstoke Road,
Bristol BS3 2NT

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Preface to Second Edition

ARROWSMITH 1854-1954 was written and produced to mark the company's first 100 years, which by coincidence was also the year in which we moved from the centre of Bristol to the edge of the city, and from the sort of building which was typical of most printers' premises before the war, to one which is typical of very many today. The problems of the immediate post-war years weighed heavily with the book's author, but his approach is still fresh today, and even after twenty-five years we get requests from customers and friends for a copy of our history.

The purpose of this second edition is two-fold, to make available the text of the first edition, and to add an account of the next twenty-five years in order to put on paper for the future what would otherwise be forgotten. No mention has been made of the names of individuals who have been responsible for developments; to name only a few would be invidious, to name them all tedious. But the act of compilation brings them thronging back to mind, many of them active and diligent within the company, many of them retired but still hale and hearty, no small number of them dead and unable to see this record of their work. To all of them these words are dedicated.

PART ONE

1854 - 1954

Introduction

IN 1854, Isaac Arrowsmith dissolved his partnership in the *Worcester Chronicle*, and moved with his family to Bristol. In the same year he became partner to a Mr. Evans, Bookseller, in Clare Street, Bristol. Together they started a penny Time Table of Steam Packets and Railway Trains. The first number was later happily found in the British Museum, and a number of facsimile copies were made many years ago, some of which survive. A reproduction of the front cover appears on page 11. It is interesting to note that at the time the Clifton Suspension Bridge had been started (both the towers are to be seen) but not completed, the promoters having run out of money. The somewhat ungainly figure of a matron with the arms of the City on her

shield, is poised between a Stephenson-type railway engine and a steam tug towing a sailing vessel up the Avon. Sail was giving way to Steam.

In 1857, Evans let Arrowsmith down, in some way not quite clear. Arrowsmith realised his losses, and moved to the edge of the quay, at 11 Quay Street, to premises which his successors were to occupy for ninety-seven years. In 1857 there was open water where Colston Avenue is now, and the smaller sailing vessels must have anchored outside the windows of the new Arrowsmith home. Across the water were the premises of a Mr. Wright, founder of the firm whose name is to-day famous as John Wright and Sons, Ltd., Medical Printers and Publishers.

JULY, 1854. **Price ONE PENNY.**

H. C. EVANS AND ARROWSMITH'S

TIME TABLES



STEAM PACKETS
TO & FROM
Bideford
Cardiff
Carmarthen
Chepstow
Cork & Dublin
Hayle
Haverfordwest
Ilfracombe
Liverpool
Milford
Newport
Neath
Padstow
Portishead
Swansea
Tenby
Waterford

RAILWAY TRAINS
TO & FROM
London
Bath
Bridgwater
Exeter
Teignmouth
Torquay
Plymouth
Gloucester
Cheltenham
Birmingham
Swansea
Haverfordwest
Chepstow
Newport
Cardiff
Merthyr
&c. &c.

GENERAL ADVERTISER
FOR BRISTOL, BATH, THE WESTERN COUNTIES, AND SOUTH WALES.

BRISTOL: EVANS & ARROWSMITH, 29, Clare Street.—BATH: Mr. JONES, 4, Claremont Buildings, Beacon Hill.—CARDIFF: Messrs. BIRD & SON, Duke Street, and Mr. WAREFORD, Bate Street.—CHEPSTOW: Mr. TAYLOR, High Street, and Mr. DAVIS, High Street.—NEWPORT: Mr. MORLOCK, Bookseller, Commercial Street.—CLEVEDON: Mr. RANSFORD, Bookseller.—WESTON-SUPER-MARE: Mr. RAWDEN, Bookseller, High Street.—BRIDGEWATER: Mr. WHITNEY, Bookseller.—YEOVIL: Mr. E. WHITNEY, Bookseller.

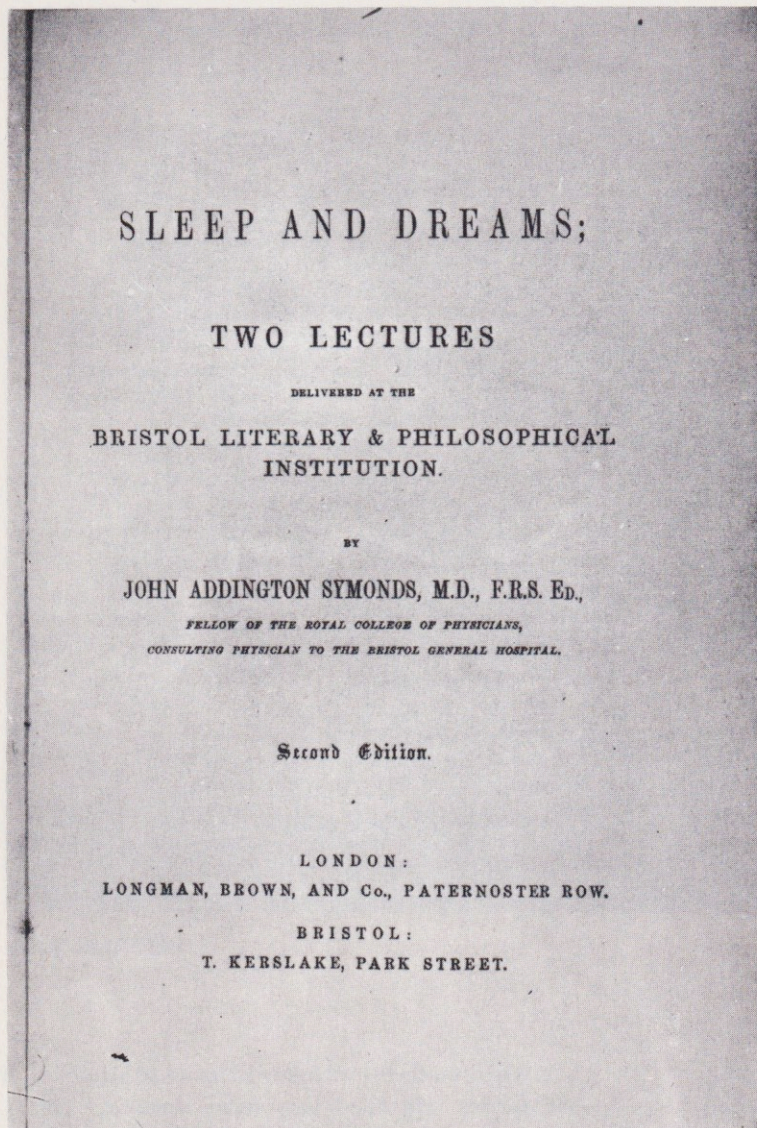
Sold on the Bristol and Exeter Railway Platforms, by Mr. WALKLEY; and on the Midland and Great Western Railway Platforms, by Mr. MARSHALL.

1854 Time Table

Isaac Arrowsmith died in 1871, and was succeeded by his son James Williams. J.W. was a character who impressed his personality on his business, his generation, and on the City of Bristol, and who is still remembered by many Bristolians who knew him. The ensuing pages will tell a small part of his story. He died in January 1913 and, having no children, left his business to his nephew, J. A. Arrowsmith-Brown; he, eighteen months later, as a pre-war Territorial officer, found himself mobilised, and did not see his business again for nearly five years. When he returned to it in 1919, his co-Director, T. H. Davies, who had kept things going all that time, had died in the influenza epidemic. It must have been a difficult home-coming.

J. A. Arrowsmith-Brown followed his uncle's tradition of public service. He filled very many voluntary offices, including that of Sheriff for the City and County of Bristol. Many people in many walks of life, apart from his business associates, were the losers by his death at an early age in 1937.

His own children being young, the control of the business passed by another nepotic succession to his nephew, R. H. Brown, the present Chairman. The process of time has brought his eldest son, J. H. Arrowsmith-Brown, to the Board of the firm, so that the family name is once again a part of the management.



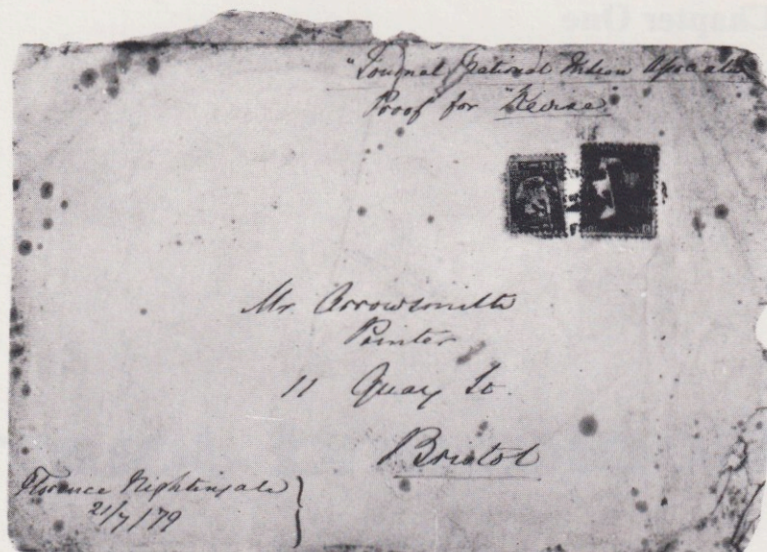
Early Title Page

Chapter One

Books and Journals

THE earliest example of an Arrowsmith-printed book is unfortunately not dated, but evidence supplied by the Bristol Central Library shows that it was the second edition of a work which had first appeared in 1851. The printer's imprint is 'Arrowsmith, Printer, Clare St., Bristol', so it must have been earlier than 1857, when Arrowsmith moved to Quay Street. The title-page is reproduced on page 12. An interesting extract from the author's preface to this second edition says: 'I had no thought of putting so slight a work again before the public, until Mr. Arrowsmith informed me that there was a demand for it, sufficient to make him desirous of printing it at his own risk.'

A treasured relic in the firm's history is a letter (with envelope) of 1879, addressed to 'Mr. Arrowsmith, Printer', by Florence Nightingale. Both envelope and letter are reproduced on pages 14 and 15. The letter appears to relate to an article which Miss Nightingale had contributed to 'The Journal of National Indian Appreciation', which was clearly being printed by Arrowsmith's. The letter includes this passage: 'The Indian Mail came in this morning, bringing such distressing news of the Dacca scarcity, that I could not make no mention of them while writing about Dacca education. I have therefore added a P.S. I trust this will not be very troublesome



to you. I am sorry to be so long. I will return a Revise as soon as possible, if you will send me one.'

At about this time I. Arrowsmith produced a type specimen book, rather grandly entitled *The Author's Guide*. It contained some advice to authors which is even more pertinent to-day: 'Let your manuscript, before it reaches the printer, be exactly as you require the print to be. Estimates for printing can be had low enough, but charges for author's corrections are always an outside consideration. It is very easy to prepare a manuscript, *verbatim et literatim*, *et punctuatim*, especially if you have had the salutary experience of footing a bill whose last item has been: "Corrections of proof by printer, 150 hours at 1/- per

hour, £7 10s.'" Our generation will wince at that one shilling per hour.

An eighty-eight-page octavo booklet entitled *Selection of Evangelical Hymns* by 'A Layman of the Church of England', and dated 1867, survives from this period. In 1881-82 there first started appearing in fortnightly parts (subsequently issued in three large volumes) the valuable *Bristol Past and Present* by Nicholls and Taylor. This was a great undertaking for a printer in a small way of business. It remains a standard reference work on Bristol history. It was the first of a long series of Bristoliana to be printed or published, or both, by the firm of Arrowsmith. Mr. Bryan Little's recent (1954) *The City and County of*

While writing about Dacca
 education. I have ^{therefore} added a.P.S.
 I trust this will not be
 very troublesome to you.
 I am sorry it is so long.
 I will return a Revised as
 soon as possible if you
 will kindly lend me one
 & beg to remain
 Dear Sir
 Your obed^t serv^t
 Florence Nightingale

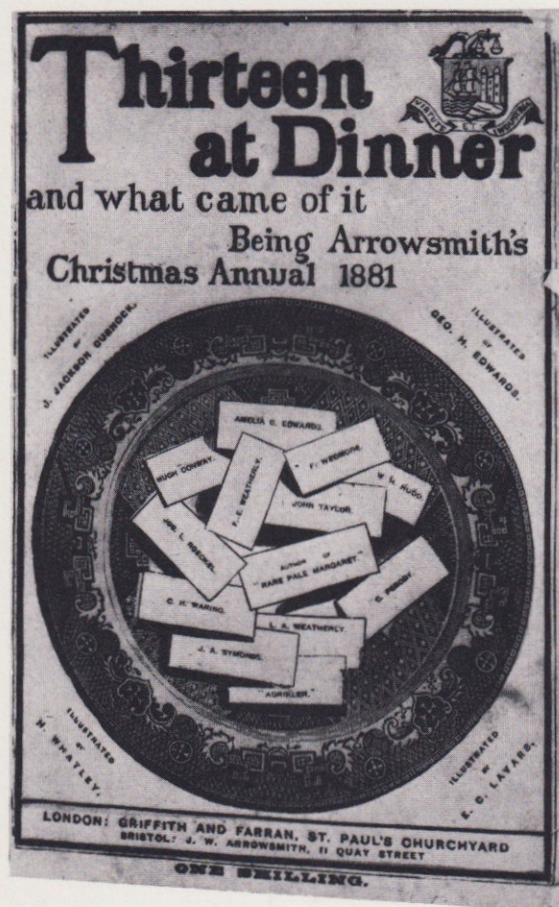
Florence Nightingale Letter

Bristol is documented with a very comprehensive bibliography; an analysis of this bibliography reveals that forty-seven of the books mentioned appeared over the Arrowsmith imprint.

It was also in 1881 that Arrowsmith (J.W.) made his first attempt at general publishing, with *Thirteen at Dinner* (page 16). Its failure cost him, and the twelve friends who joined him at that dinner, £250. Undaunted he tried again in 1882, alone, and failed again. The third attempt, still out of his own resources, was in 1883. He persuaded Fred Fargus (Hugh Conway) to write for him, for the sum of £80, a story with the title *Called Back* (page 16). This was going the way of its predecessors until Labouchère

wrote his famous review in *Truth*—‘Who Arrowsmith is and who Hugh Conway is I do not know, but . . . Wilkie Collins never penned a more enthralling story. I am in despair at thinking that I have read it. Those who have not, have a pleasure to look forward to.’ From that day until the expiry of the copyright some fifty years later, the presses of Arrowsmith’s were constantly engaged in meeting the demand for the original ‘shilling shocker’. To the honour of J.W. it must be recorded that he tore up his first contract with Fargus, and replaced it with one giving the author royalties on every copy sold.

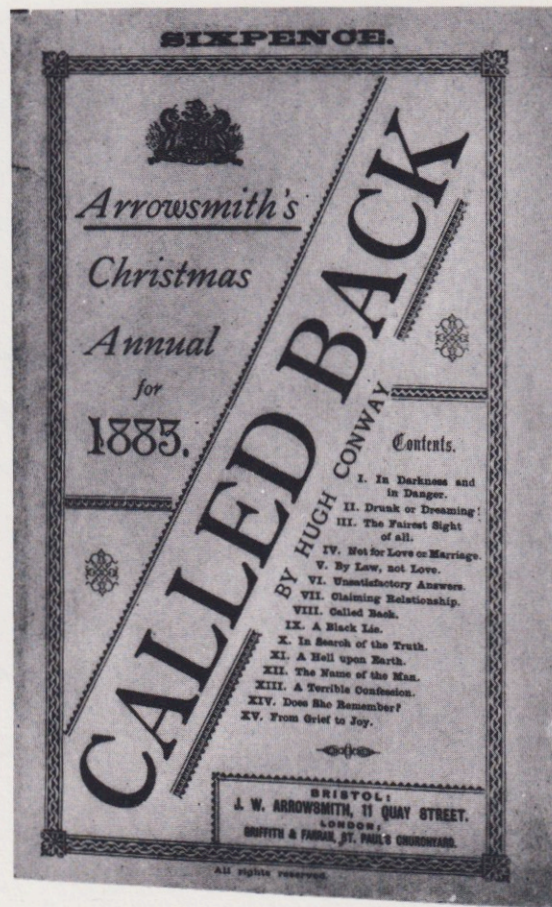
J.W.’s publishing star had risen, and it blazed brightly for a period of ten to fifteen years which saw



Thirteen at Dinner

Three Men in a Boat (the sales have never been computed, because it was pirated in America), *Three Men on the Bummel*, *Prisoner of Zenda*, *Rupert of Hentzau* and, smallest in sales but greatest in reputation, *The Diary of a Nobody*. For many years every copy of every English edition of these titles was printed in Quay Street, Bristol, in the cellar which did duty as a machine room.

But at the turn of the century, the flair, touch, luck, or whatever it was, deserted J.W. Though he published (and printed) for Conan Doyle, Chesterton, Belloc, and even Marie Corelli, he never again found a seller, a success. The star had set, and two world wars, the second of which allowed the firm a paper



Called Back

quota insufficient to meet the demand for *Three Men in a Boat* alone, saw its eclipse.

To the latter period of J.W.'s publishing life belong some fortunately preserved letters from W. G. Grace. J.W. was active in the affairs of Gloucestershire County Cricket Club in its early days, so it was natural that W.G. turned to his old friend to publish his definitive book on cricket. Friendship was sadly strained. The Publisher wanted a popular one-shilling book with a wide sale. The Champion wanted handmade paper, heavy binding, and gilt tooling. The Champion won in the end, as existing copies of the book (about two inches thick and very sumptuous) show. But the battle was spirited. It is a great pity that

J.W.'s replies are not preserved, as he surely gave good measure in answer to such letters as these:

31st August, 1891.

Dear Arrowsmith,

It is very annoying to think you won't do this little book as I wish. If you do it at all, why not properly. The specimen you have sent is too common a style.

Yours in haste,

W. G. Grace.

P.S. It will pay you better in the end to do it well.

Friday.

Dear Arrowsmith,

I do not at all understand the tone of your letter, and think with you that you had better not at present proceed any further in the matter.

Yours in haste,

W. G. Grace.

Oct. 1, 1891.

Dear Arrowsmith,

I have put your letter in the fire, and hope our present friendship will be the same as before, although on business matters we do not agree.

Yours truly,

W. G. Grace.

'Our present friendship' did survive to find expression four years later, when the *Champion* had made the first hundred centuries, in the following:

June 10, 1895.

My dear Arrowsmith,

Let me thank you for all the interest and trouble you are taking about the testimonial. I shall always be grateful to you and others for what you are doing.

Yours very truly,

W. G. Grace.

As publishing declined, so the book-printing capacity of Arrowsmith's was turned over to book production for other publishers. The year 1930 saw the first volume of the long series of the Bristol Record Society, which is doing such valuable service to historians in publishing the wealth of material in the Bristol archives. In quite a different field, the annual publication, *Police and Constabulary Almanac* has been Arrowsmith printed since the early 1920's. In 1948 *Garcke's Manual of Electrical Undertakings* was added to the firm's production, and

1954 saw the advent of *The Advertiser's Annual*. The last ten years have seen a growing output of books for London publishers, mostly in the technical and scientific field.

In journal printing, special mention must be made of three. The *Medical Journal of the South-West* (formerly *The Bristol Medico-Chirurgical Journal*) has enjoyed an uninterrupted publication since 1883, and has never been printed anywhere but at Arrowsmith's. *The Universities Review*, the journal of the Association of University Teachers, has been printed at Arrowsmith's under the editorship of Professor C. M. MacInnes since 1928.

Unfortunately for the record, the first two or three numbers of *The Cliftonian*, the magazine of Clifton College, were printed by J. Baker, in the Mall, Clifton. However, since 1870 every number has been printed by Arrowsmith's, and one of the earliest schoolboy contributors, A. T. Quiller-Couch, later became an Arrowsmith author. Arrowsmith's have in their files what is probably one of the very few complete sets of *The Cliftonian*.

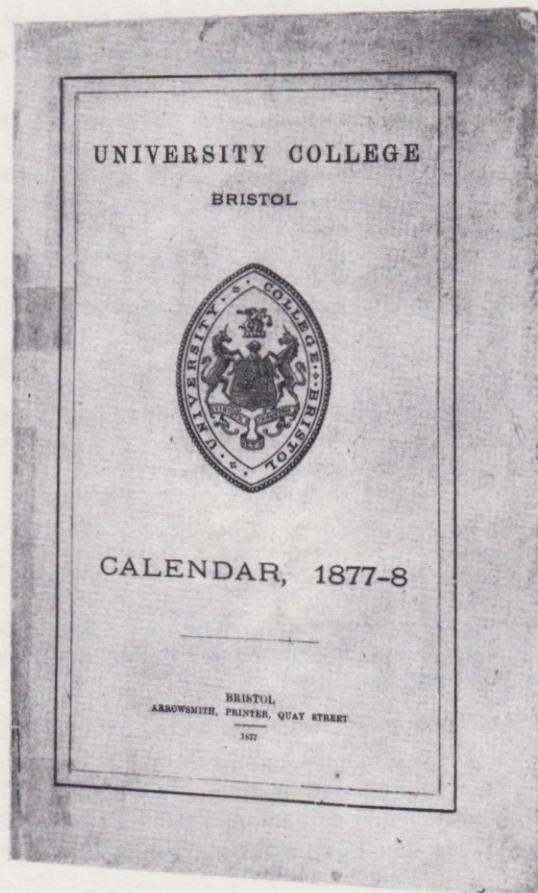
A History of Clifton College, Clifton at Bude and Butcombe, and the *Clifton College Registers* of 1897, 1904, 1912, 1925, 1947, were all products of the Arrowsmith connexion with the School. The 1947 *Register*, containing biographies of twelve thousand Cliftonians, is an outstanding example of a combination of editorial and typographical skill.

In recent years the firm has been privileged to produce quarterly the *Bristol Review*, the house journal of The Bristol Aeroplane Company Ltd. With a circulation of 15,000 per issue, this must be an outstandingly successful example of internal public relations in a large industrial concern.

Also since the 1939-45 war *Ship-Shape*, which is a quarterly house journal of the Port of Bristol Authority, carries news of the Port to shipping interests all over the world. The firm has a very long association with the Port of Bristol in an annual publication *Arrowsmith's* (late *Bunt's*) *Bristol Channel Tide Table*. Who Bunt was, and how long ago he became 'late', we do not know; but the 1955 issue of this annual was the 120th issue, and it has been an Arrowsmith product for as long as anyone living can remember.

Chapter Two

The University of Bristol



University College Calendar

THE year 1877 is the date of the first *Calendar* of University College, Bristol. It was a paper-covered pamphlet, and was printed by 'Arrowsmith, Printer, Quay St., Bristol'. This annual production has become over the succeeding seventy-seven years a cloth-bound book of four hundred pages (see pages 18 and 19). It has always been printed by Arrowsmith's, and symbolises the firm's continuous and close association with that great centre of learning which has grown out of the old University College.

J.W. was one of the small band of Bristolians who, 'for thirty years kept the struggling University College on its feet until the "Sun in Splendour" of the

Wills family rose on the promising scene' (Cottle and Sherborne: *The Life of a University*). His particular contribution was the University College Colston Society, a body of Bristol citizens who wished to assist the University College, and which to-day is the 'Colston Research Society'. From its inception in 1899 the registered office of this Society has always been the address of Arrowsmith's, and its Honorary Secretary has by tradition been for three generations the Chairman of Arrowsmith's. J.W.'s contribution to the University is commemorated by the Arrowsmith Tower, in the entrance hall of which a bronze tablet records the following unusual tribute to an employer from his staff:

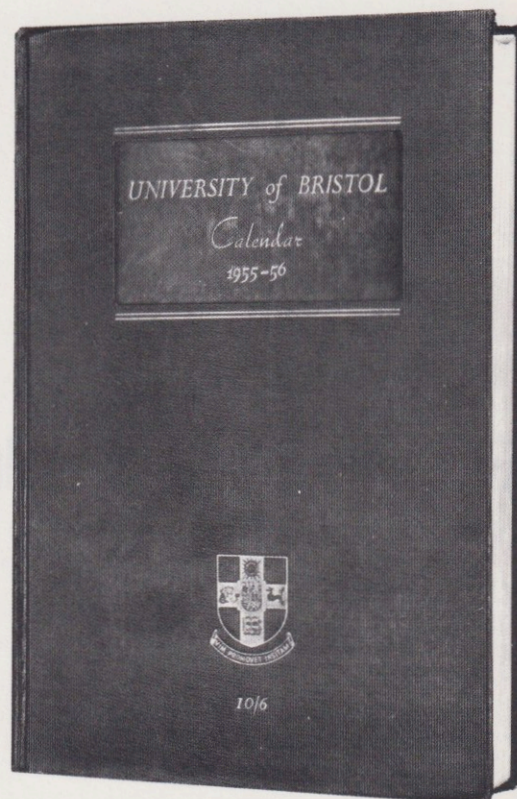
By leave of Council the workpeople of James Williams Arrowsmith of 11 Quay Street, Bristol Printer and Publisher and others connected with him in his business set up this tablet as a mark of their esteem and regard as well as to record that on the 22nd day of September 1911 Council resolved in commemoration of the distinguished services rendered by him to the University that this tower should henceforth be known as The Arrowsmith Tower.

From three-quarters of a century of printing for so great an organisation as a university, it is difficult to pick out single items. When the famous buildings at the top of Park Street were opened by King George V, an illustrated brochure was produced by the firm with many beautiful half-tone reproductions of the architectural features, and this has found a permanent place in the bibliography of Bristol and of the University. In the 1930s the University's first academic publishing was a series of *University of Bristol Studies*, printed and published by Arrowsmith's. In 1937, the results of the Social Survey of Bristol, promoted by the Colston Research Society, were published by Arrowsmith's in pamphlet form as *The Standard of Living in Bristol*, a small work which attracted nation-wide interest.

Immediately after the 1939-45 war, one of the ways in which the University met the post-war challenge was the launching of the 'Churchill Appeal'. The printed form of the appeal was a brochure of unusual typographic design, which carried this imprint: 'Printed and presented / to the Appeal Committee / by / J. W. Arrowsmith Ltd. Bristol / Printers to the University.' This first use of a distinguished imprint makes this piece of printing a landmark in Arrowsmith history.

The post-war years have seen over the Arrowsmith imprint seven volumes in the series of *Colston Papers*. These are the proceedings of the annual symposia promoted by the Colston Research Society, and the world-wide distribution of the series contributes to the influence of the University in the world of science and the arts.

In 1951 was 'Published for the University of Bristol / by J. W. Arrowsmith Ltd. / Printers to the University', the first full story of Bristol's University. *The Life of a University*, by Cottle and Sherborne, is a



University Calendar

compact and richly illustrated account of the academic life which in a few years has so much enriched the ancient mercantile City of Bristol.

In 1953 appeared *Science and Fruit* (edited by Wallace and Marsh) commemorating the jubilee of the Long Ashton Research Station 1903-53. This book was issued to mark appropriately the completion of a half a century of the establishment which has made so important a contribution to agriculture in general, and to the growing of fruit in particular.

In 1955 it was the turn of Bristol to entertain the British Association of the Advancement of Science. Arrowsmith's printed the commemorative book, *Bristol and its Adjoining Counties* (edited by MacInnes and Whittard). This was presented to every member attending, and has subsequently been available to the general public.

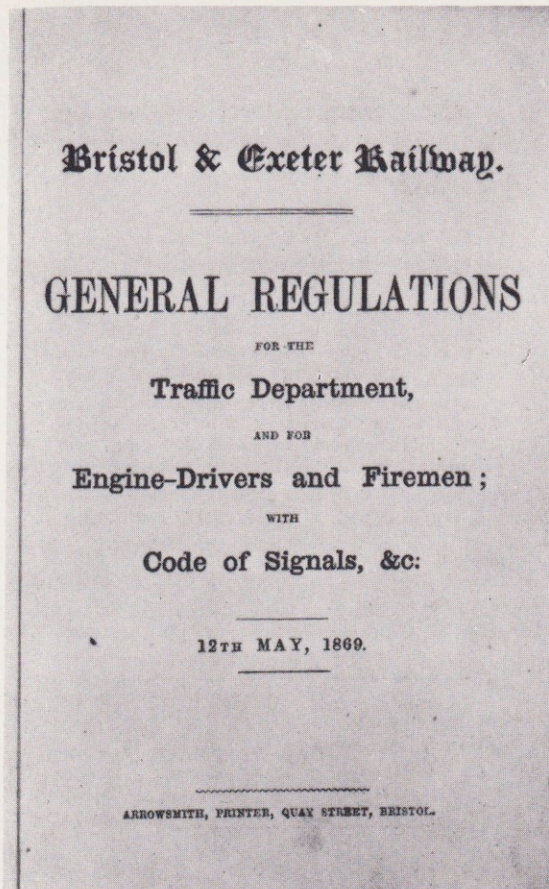
Chapter Three

Railway Printing

EVANS AND ARROWSMITH'S Time Tables of 1854 were obviously the start of the firm's railway association. A bound volume of the Time Tables for the year 1857-64 contains many advertisements of the railway companies and their excursion trains. It is reasonable to suppose that this connexion led to printing orders. It is certain that the firm were doing railway printing by 1869, for there survives a copy of *Bristol and Exeter Railway—General Regulations*, bearing that date and with the Arrowsmith imprint. On page 21 is reproduced the title-page and a page of the text, showing top-hatted and frock-coated operators of signal flags. Number seven of the then General Regulations forbids servants of the

Company to 'enter into any angry discussion, or give rude answers to anyone'. Number twelve lays down that 'no money or gratuity... is allowed to be received from passengers or other persons by any servant of the Company under any pretence whatever'.

From 1877 we have a forty-page pamphlet of *Time Tables—Bristol and Exeter Railway, and Other Railways in Connection*. The imprint here is 'Bristol/Printed for the Company by J. W. Arrowsmith / At the Railway and General Printing Offices / 11 Quay St.' Clearly the firm by this regarded themselves as 'Railway Printers'. Mr. G. W. Roberts, formerly Works Manager, and now in



Bristol and Exeter Railway

retirement, recalls that when he was apprenticed in 1893, his first job was to assist a compositor on railway excursion posters; and from that same year survives a fifty-two-page pamphlet *Great Western Railway, Bristol Division—Notice of Extra Trains and Special Arrangements*. Arrowsmith's print that particular notice to-day for British Railways, Western Region, and believe that they have printed it every week for the whole of the sixty-one years since 1893.

Neither amalgamation nor nationalisation interrupted Arrowsmith's railway connexion. In 1938 a contract started for *The G.W.R. Magazine*, the staff journal of the Company, which still appears

monthly over the firm's imprint for the Western Region of British Railways. In 1954 a large section of the firm's business is in Working Time Tables and other printing concerned with the vital business of operating passenger and freight trains over the rail systems of the country. Every Tuesday afternoon throughout the year, two railway officials come to Arrowsmith's to pass for press a pamphlet issued to every guard, driver, and fireman on the Western Region, detailing the engineering works proceeding on the line and the speed restrictions which are in force.

It is a long way from the 'Steam Packets and Railway Trains' of the 1854 Time Tables.

FREEHOLD DWELLING HOUSE
IN
STOKE'S CROFT, FOR SALE.

Messrs.

BARNARD, THOMAS & CO.

are instructed to SELL by

AUCTION,

AT THE

FULL MOON HOTEL

NORTH STREET, BRISTOL,

ON

TUESDAY, October 10th, 1865,

at Six for SEVEN o'Clock p.m., all that NEAT and COMMODIOUS

DWELLING HOUSE

YARD, GARDEN AND PREMISES,

No. 18, STOKE'S CROFT, BRISTOL, the residence of the late
Miss REES, deceased.

They have been occupied by the late proprietor for the last 35 years, and have always been kept in excellent repair. All the front Windows are Plate Glass.

There is a Fee Farm Rent chargeable on the Property of **£1:7:0.**

For Particulars apply to **WILLIAM DAVIS, Esq.,** Solicitor, Haverfordwest; **Messrs. BRAMBLE & BLACKBURN,** Solicitors, Nicholas Street; or to the Auctioneers, Albion Chambers, Bristol.

ARROWSMITH, Printer, 11, Quay Street, BRISTOL.

Auction Poster

Chapter Four

General Printing

THE title of this chapter is chosen for want of a better. The printing trade persists in the term 'jobbing' for work which defies a more precise classification. 'Jobbing' has an unfortunate smack of the dishonest, and suggests the cheap and trivial. Certain it is that printing of this class is ephemeral, and the firm are fortunate in having preserved so many interesting examples.

Pride of place goes to the score-card (page 24) of the celebrated match on Durdham Down in 1863 between xxii of Bristol and District and the All-England xi. Due largely to the performances of two of the four Graces playing, All-England were beaten by an innings. In the absence of real

evidence we can only assume that this card was printed on the ground. There is ample evidence that from about the 1880's until 1914 Arrowsmith's had the contract for printing score-cards on the ground for Gloucestershire County Cricket Club. It is possible that the 1863 specimen is one of the earliest specimens of a cricket score-card so printed.

An auctioneer's poster in excellent preservation, considering its date of 1865, reproduced on page 22, may be regarded as a good example of the bread-and-butter work of a printer in any age. Such ephemera are seldom preserved, and this fortunate specimen is the sole survivor of a series which Arrowsmith's have

GRAND CRICKET MATCH.			
DURDHAM DOWN, BRISTOL, August 31st, September 1st & 2nd, 1863.			
ALL ENGLAND ELEVEN v. 22 OF BRISTOL & DISTRICT.			
BRISTOL.		First Innings.	
E M Grace, Esq	...	1 b w. b Jackson	37
D E Bernard, Esq	...	b Willsher	0
W Jones, Esq	...	c Willsher, b Tarrant	10
J D B Trenfield, Esq	...	st H Stephenson, b Tinley	13
S Bramhall, Esq	...	c Moore, b Jackson	7
E A Howsin, Esq	...	b Jackson	0
J Sewell, Esq	...	c & b Tarrant	38
E T Daubeney, Esq	...	c Stephenson, b Jackson	44
J Allen, Esq	...	b Tinley	3
W G Grace, Esq	...	b Tinley	32
W E Mirehouse, Esq	...	c Tarrant, b Tinley	1
A F Davie, Esq	...	c Clarke, b Tinley	4
H Grace, Esq	...	b Jackson	0
J F Fussell, Esq	...	st Stephenson, b Tinley	1
A Grace, Esq	...	c Anderson, b Tinley	3
T H Hill, Esq	...	b Tinley	10
W Pillinger, Esq	...	b Jackson	0
J Mirehouse, Esq	...	c Anderson, b Tinley	2
R Bruce, Esq	...	b Jackson	0
Savage, Esq	...	c Moore, b Jackson	0
Budge, Esq	...	st H Stephenson, b Tinley	0
L Harris, Esq	...	not out	1
		b 2, 1-b 4, w, n-b	6
		Total	212
ENGLAND.		First Innings.	Second Innings.
G Tarrant	...	c Sewell, b Daubeney	7 run out
E Willsher	...	b E M Grace	11 c & b E M Grace
E Stephenson	...	c W G Grace, b Daubeney	7 c E M Grace, b W G Grace
T Hayward	...	b Daubeney	3 c sub. b Daubeney
W H Moore, Esq	...	b E M Grace	8 b E M Grace
G Anderson	...	b E M Grace	4 b Howsin
A Clarke	...	c W Mirehouse, b E Grace	c Budge, b E M Grace
Julius Caesar	...	b E M Grace	0 st Pillinger, b Daubeney
H H Stephenson	...	not out	18 st Pillinger, b E M Grace
J Jackson	...	c & b Daubeney	15 c Davie, b E M Grace
R C Tinley	...	c Sewell, b Daubeney	6 not out
		b, 1-b 1, w 2, n-b	3 b 1, 1-b, w 6, n-b
		Total	86
		Total	100
Umpires.—Pullen and Fowtham.			
ARROWSMITH, Printer, 11, Quay Street, Bristol.			

Cricket Score Card

produced over probably most of their century of trading.

Dated 1869 is an odd little booklet *On the Growth of White Mustard as a Forage Crop*—sold by J. Senior, Caundle Bishop—which is an advertisement for an agricultural seed merchant. *The Book of the Words of the New Comic Christmas Pantomime, Performed at the New Theatre Royal, Park Row, Bristol*, is from 1873. A *Catalogue of the Annual Exhibition of the Bristol Academy for the Promotion of the Fine Arts*, is 1874. A little vest-pocket-size booklet of 1877 is *Rules Etc. with Statement of Accounts, of the Clifton Cricket Club*. A similar production of 1878 is the *Rules and Fixtures of the Clifton Bicycle Club*. Under

'Rules of the Road' occurs the curious regulation that 'A horse shall never be passed on both sides at once'; and rule seven is of interest to the social historian: 'The Club will pay the expenses of any member who prosecutes a person for stone or cap throwing, or other mischievous interference with bicyclists.'

From 1879 there are some interesting pamphlets. *The Thirty-Seventh Report of the Bristol District Institution for the Deaf and Dumb*; and *Report and Proceedings at the Eighth Annual Meeting of the Bristol Museum and Library*. Of special interest to historians of Bristol is a sixteen-page *Orders and Rules of the Tolzey and Pie Poudre Courts*. The Tolzey was probably the earliest of all Bristol courts, and the Pie Poudre (Dusty Foot) was a survivor of the summary courts attached to fairs, for the prompt settlement of market disputes. A *Catalogue of Foreign Timber, etc. to be sold by Public Auction* has a footnote on the cover stating that 'Luncheon will be provided each day at 11 o'clock. Sale will commence at 12 o'clock sharp.' A repast at that hour of the day, and with a sale in view, was presumably more liquid than solid.

From a number of menus (always a staple line for 'jobbing' printers) we may select three. *Complimentary Supper to Henry Irving*, given in 1894 by 'The Century Club of Bristol'. *Invitation Luncheon to Mr. Herbert Beerbohm Tree*, at the Liberal Club, Bristol in 1897; and in the same year *Banquet to Mr. W. G. Grace in Celebration of his One Hundredth Century*. On the back of this menu is a poem signed 'E.B.V.C.', the standard of which is exemplified in the final verse:

Stay of Gloucester, England's pride,
W.G.!

Pride of all the world beside,
W.G.!

Fame soon yours, You've never lost her;
Now the game of games to foster
We acclaim your Grace of Gloucester,
W.G.!

A generation which has seen Hobbs, Hammond, Hutton, and Bradman, finds it difficult to share the excessive enthusiasm of the Victorians for W.G.'s hundred hundreds, but it was clearly regarded as something out of the ordinary and justifying any extravagance—even in verse.

With only a century of existence Arrowsmith's are newcomers beside the Bristol wine merchants, John Harvey and Sons Ltd. But for two or three generations at least, the firms have done business together, and in 1955 a great deal of the printing which helps to sell Harvey wines all over the world is produced in the new Arrowsmith factory.

Other long established West Country business associations are with the Bristol Waterworks Co., The Bristol Sand and Gravel Co. Ltd., William Cowlin and Son Ltd., Ferris and Co. Ltd., Gardiner Sons and Co. Ltd., The Holms Sand and Gravel Co. Ltd., McArthur and Co. (Steel and Metal) Ltd., Rowe Bros. and Co. Ltd., Mark Whitwill and Son Ltd.

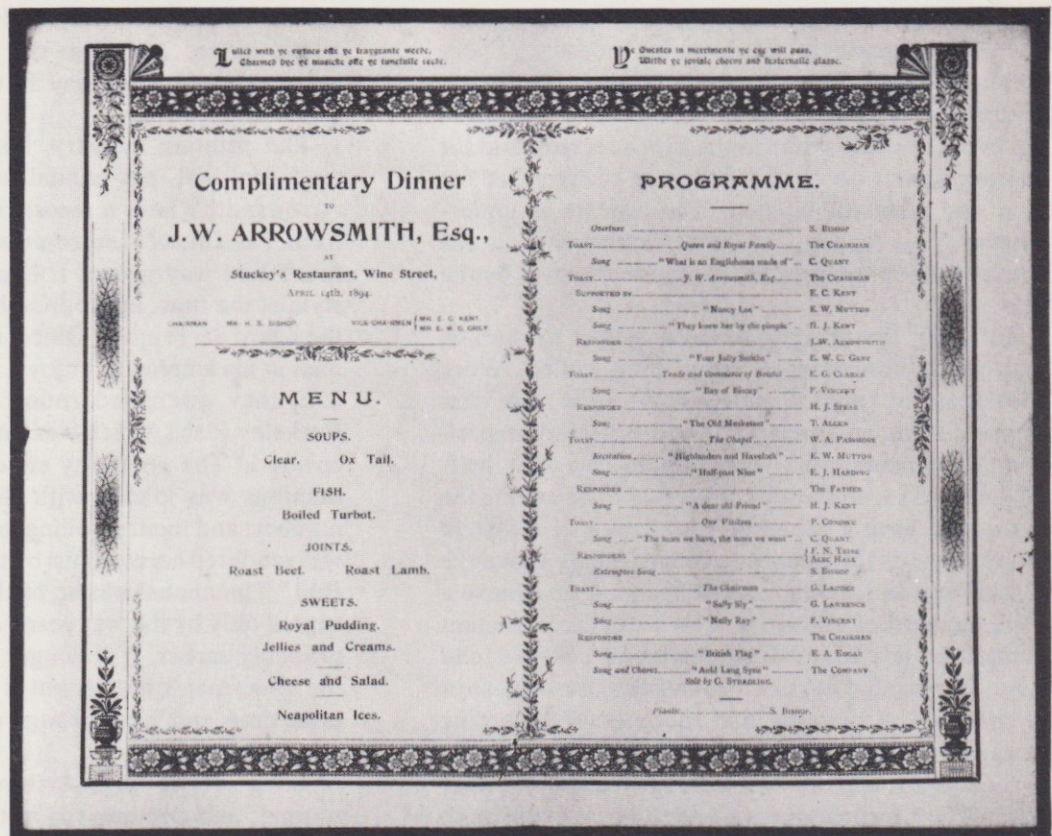
Chapter Five

Domestic Affairs - One

THE story of a business over a century may too easily become the story of its contacts with the world it serves. But this is far from being the whole story. Any business is a living organisation of the men and women who find their livelihoods in it—generations of men and women. A family business has always a personal atmosphere, and a sense of relationship, which is quite as important to the story of that business as anything else in its development.

When J. W., in his early twenties, joined his father in the business, he was paid three shillings a week, and was made to keep meticulous accounts of his personal expenditure, which received the parental approval and signature. Copies of these 'audited accounts' still

survive. It may well be that memories of the early discipline at a paternal hand caused J.W. to be the generous employer that he was. It is true that in 1874 we find him writing angrily to a forerunner of the present Typographical Association: 'I cannot too strongly express my disapprobation that the profession of printing in Bristol is descended to the low ebb of requiring an agitator to come amongst them for the purpose it seems to me of spreading discord . . . You will be good enough to understand me that I do not so much object to paying the 2d. extra overtime as to the manner in which it is demanded.' It was probably two years later, in 1876, that his employees each received a week's paid holiday. By



Complimentary Dinner Menu

1882 he had perceived the benefits of insurance for his employees and was ready to effect it. The gift was perhaps more qualified than our generation would consider proper, but such a proposal must have been much in advance of his time. Finally, in 1894, he took an important step: he reduced the working week of his employees to forty-eight hours. The customary week in the printing industry at the time was fifty-four, and it was twenty-five years later, in 1919, that the forty-eight-hour week was adopted by the industry on a national basis; the same national agreement made universal the week's paid holiday. On 14 April, 1894, J.W.'s employees gave 'A Complimentary Dinner to J. W. Arrowsmith Esq.', at

Stuckey's Restaurant, in Wine Street, in honour of this innovation, and the menu is reproduced on this page.

At about the same time he started the Arrow Bowling and Quoits Club, with permission to use a corner of the Gloucestershire County Ground. Originally a sports club confined to the staff of Arrowsmith's, later, when support from the firm languished, the club passed into other hands. To-day the Arrow Bowling Club, which has no connexion with Arrowsmith's beyond a common ancestry, is one of the leading bowling clubs in the West Country.

The pattern set by J.W. has been repeated in recent years. In 1948 there was introduced one of the

non-contributory pension schemes, which have since become increasingly popular in industry. Every employee of the firm, whatever his or her position, is insured by the firm for an immediate cash benefit in the event of death while in the firm's service, and for an endowment on reaching the age of sixty-five for men and sixty for women. The scheme is underwritten by a leading insurance company, and the whole of the premiums for everyone are paid by the firm.

In 1950, the printing industry began to discuss, with many misgivings, a 'new thing' called 'Work Measurement and Payment-by-Results'. A few printing firms, in England and in Scotland, experimented. Arrowsmith's were among the first half-dozen to do so, and to-day are proud to be among the earliest to have a complete installation of a system which rewards the operative with earnings above the normal and which enables management to achieve a high standard of efficiency. The work measurement method upsets many long-cherished customs and ways. Its introduction to a firm causes a drastic change in methods of working and methods of recording work. Those most affected are the skilled operatives in the factory, and the overseers responsible for their work. Their forbearance and intelligent readiness to experiment were the prime factors in this conversion to new methods of conducting one of the oldest industrial processes.

The Arrow Bowling and Quoits Club of the end of the nineteenth century was reborn in spirit in 1947 as the Arrow Skittle Club. Playing weekly in the season in the Bristol Commercial House League (they were third in 1953-54) the Skittle Club has become the focus of the firm's social activities. Annually the club plays the office staff for the Alpass Cup, a blood

match which casts its shadow of leg-pulling for weeks before and after the event, and which has become a red-letter day in the Arrowsmith social calendar.

The printing industry, faithful to tradition, still tends to call an annual outing a 'wayzgoose'. Arrowsmith's have a record, in the form of a reprint from *The Bristol Advertiser* of 18 July, 1856, of the firm's first wayzgoose. It begins, in the journalistic style of the time, appropriately: 'Mr. Arrowsmith, of the Clare St. Printing Office, in this City, led out the men in his employ to enjoy a rustic holiday. At eight a.m. they assembled round his breakfast table in Berkeley Place, which was bountifully and tastefully covered.' The great day ended when 'at eleven the omnibus was loaded with the company, twelve in number; and thence, rolling on towards Clifton, night was rendered harmonious by the hearty songs of John Bull.' The annual outing of the firm has been interrupted only by the war years, at least since 1920, and probably earlier. It no longer starts with breakfast at the Chairman's house, but it still ends at about the same time, and 'hearty songs' are not unknown on the way home.

Long service with Arrowsmith's is regarded as normal, and comment is not aroused until at least forty years have been passed. A third-generation apprenticeship was recently begun, father and grandfather having both been indentured to the firm. On the occasion of his business jubilee in 1911, J.W., addressing a dinner company of the firm, said: 'I do not suppose there is a single house in Bristol where they are working together more peacefully than we are in Quay Street.' In 1955 his successors can echo those words with the change of 'Winterstoke Road' for 'Quay Street'.

Chapter Six

The New Home

DURING the sustained air raids on Bristol in the winter of 1940–41, Arrowsmith's regarded with mixed feelings the widespread destruction of printers which went on. It was a privilege to provide temporary house room to no less than seven competitors who had lost everything, but it was with a sense of frustration that the firm saw its unsuitable premises surviving the worst onslaught of the Luftwaffe, while others were having similar buildings converted into the good hard cash of War Damage Insurance. Gratitude for being spared the dislocation and loss which follows total destruction was tempered in the Arrowsmith mind with regret that a clean

sweep of out-of-date buildings was not achieved with benefit of War Damage (page 30).

Instead, the firm faced the post-war years with a pressing need for new accommodation, and a cast-iron front of opposition to private spending in any form whatever. From 1947 to 1952, a useless battle was fought to acquire the smallest licence to build. Quite rightly, such building licences as were available for the printing industry were going to victims of the blitz. To those 'unlucky' enough to have survived the blitz, this was a five-year period of extreme frustration. At last, in 1952, the dam began to break, and the ensuing two years saw the erection at Winterstoke



The Old Home

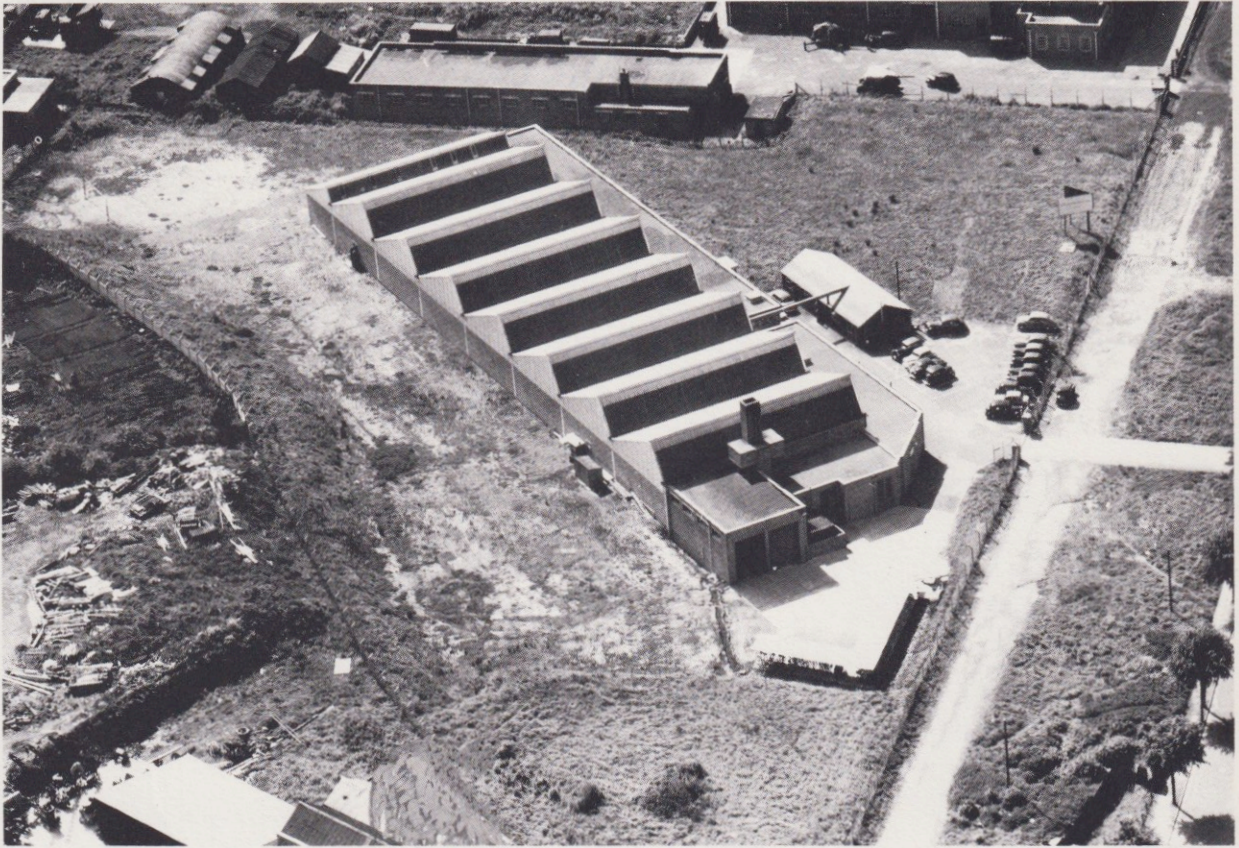
Road of the 27,000-foot factory which is the first part of a three-stage development plan.

The present building is all on one floor and under one roof. The latter is of the 'saw-tooth' or 'north light' variety, which ensures an even admission of daylight throughout the year. To overcome the reluctance of the English climate to decide what 'daylight' is, a modern system of fluorescent lighting is installed, which gives a lighting intensity over all which improves on nature during most of the winter months. Heating and ventilation are provided by a plenum system of the introduction through vents of heated fresh air, and extraction by the same means of used air. A filter traps the impurities of Bristol's air on the way in, and it can be claimed for this system that

the air breathed in the factory is more pure than that breathed outside.

Pre-stressed concrete beams have given a lateral span of seventy feet without intervening supports or obstructions of any kind. All services are carried overhead, and come down to machines as required. This leaves the floor entirely unencumbered of any obstruction, and the maximum flexibility of plant layout is ensured. Any machine, or combination of machines, can be moved at any time to fresh positions, without structural alteration, and with the minimum of disturbance.

Modern handling methods of the pallet and the fork-lift truck make use of height as well as floor space to fit into the new building a stock of paper

**The New Home 1954**

which was formerly housed in five separate buildings scattered about Bristol. The hard physical labour of 'humping' paper up and down stairs and in and out of lifts is now taken over by the iron man of the electrically operated machine. The motto of the new factory is 'machines before muscles' and 'brains before brawn'. Why should the human frame exert itself to do what the machine can perform efficiently?

Years of thought and planning went into the construction of the new building, the layout of plant in it, and the immensely complicated jigsaw of moving from old to new without interruption of service to customers. One of the outstandingly successful tools in all this was a three-dimensional model of the new factory and of every item of plant and machinery in

the old. Long before the building was complete, the exact position of everything in it was decided on this model, and 'moving house' proceeded without a hitch to an exact pre-conceived plan.

The interior of a one-floor factory measuring seventy feet by three hundred feet is impossible to photograph satisfactorily because of difficulties with perspective. No attempt has therefore been made in this little story of the past to illustrate the new home which Arrowsmith's first inhabited in the hundredth year of their life. For a better acquaintance their friends are asked to visit Winterstoke Road at any time to see an example of a modern printing factory in which a firm with a long history embarks on its second century.

PART TWO

1954 - 1979

Customers

partly because of the very efficient and the
improved working conditions provided. It is
important to extend this conclusion, and the
different form of an agreement was reached. The
company's policy at the time was to retain all and
every trace of history and that was what led to
this agreement. However, it is often taken to mean
company reports or information in large quantities
or in some in one place or in many. It was not
to provide a complete record of each company
when it was founded and not to include any
information which might have been lost or
of any other kind of information. The result was
actually the first time when company history was

history. It was not the first time when company
history was recorded in a book. It was the first
time when the company had produced a
report on the history of the company in the form of a
book. This was the first time (1954-1979) the same
company will be given to the company's customers
and the company is then that has taken
into account the company's history and what it is after
it has been founded as a company. It was the first
time the world was a company book and the world
was founded in 1954.

When we had signed the book in 1954, we
had not started on our second company's
history. It was the first time when company history

Chapter Seven

Customers

WHEN Dick Brown wrote the Arrowsmith centenary book in 1954, he devoted most of it to the customers and types of work that the company had undertaken during its first hundred years. In this account of the next twenty-five years (1954–1979), the same emphasis will be given to the company's customers and to the many changes in them that have taken place since the centenary book was written. It is, after all, only by examining its customers that one can grasp the work that a company does, and thus what that company is.

When we had settled ourselves at Winterstoke Road, and had started on our second century, a considerable expansion of output became possible,

partly because of the extra efficiency that the improved working conditions permitted. It became necessary to expand sales continuously, and two different lines of development were pursued. The company's policy at the time was to solicit all and every type of printing job that was offered, books or catalogues, brochures or leaflets, labels or stationery, company reports or prospectuses, in large quantities or in small, in one colour or in many: the aim was to provide a complete service to each customer: what we at Arrowsmiths could not do ourselves, was contracted to trade houses. Such was the sales policy of very many printers in the mid-fifties. The work we actually did fell into two broad categories: on the one

side there were the books and the book type of work, sent to us by the London publishers, by British Railways, by Bristol University, and by a number of customers in Bristol and London: it involved much composition, was mostly in one colour, and technologically demanded very similar sorts of equipment and of skills. On the other side was the advertising printing and general jobbing: this work tended to require much less composition and more printing, to be in several colours and not one, and above all to demand a very wide variety of skills and equipment, and to pose very heavy demands on the factory managers, overseers and craftsmen who actually had to produce it. The first type of work, the bookwork, came mostly from established connections and from the London office, while the second type was solicited for us by three salesmen working in Bristol.

On the advice of consultants a survey of work was undertaken to decide which customers paid us best, and the decision was made to expand our sales of advertising literature and "general jobbing", at the expense of bookwork. To this end three new salesmen were engaged, later increased to five, and were set to work in territories radiating out from Bristol: one covered the area from Bristol east to Reading, one the South West, and one South Wales. To start them on their way a list of customers was purchased from a direct-mail company, and a series of mail shots were despatched. One shot at any rate hit its target, and a Devonshire company expressed to the Sales Director its displeasure at the blasphemy of the message illustrated on page 36.

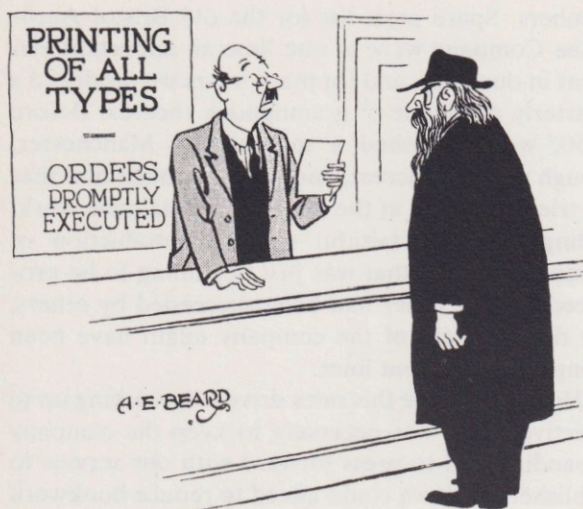
The three new salesmen were appointed at the end of 1955, and joined the existing sales force of three in Bristol and two in London.

The London office called on both publishers and advertising customers, the six Bristol salesmen on advertising and general customers, and during the next five years strong efforts were made to carry out the recommendation of our consultants and to expand our 'general jobbing' sales. We tried our hand at a great variety of work, at a catalogue for a manufacturer of poultry-butcherer machines, at leaflets for engineers and for auctioneers, in one or many colours, illustrated and plain, in large and small

numbers. Spare parts list for the old Bristol Aeroplane Company were at one time an important element in our sales, and for many years we produced a quarterly catalogue of gramophone records. Before 1960, we established a salesman in Manchester, though without success, and it was through him that we tried our hand at the mail-order catalogue work, calling for very faithful colour reproduction of consumer goods, that was just beginning to be produced. If that order had been succeeded by others, the development of the company might have been along quite different lines.

However, while this sales drive was working up to effectiveness it was necessary to keep the company expanding and to press forward with our service to publishers until we could afford to reduce bookwork in favour of advertising work. Before we left Quay Street we had realized that the prices to be obtained for mathematical composition were far more favourable than those for more straightforward books, and vigorous efforts were made both by our London salesmen to persuade publishers to send this difficult and unusual work to an unknown typesetter, and by our composing room to produce it efficiently and cheaply. The turning point came when Mr. Maxwell of Pergamon Press entrusted us with a large journal on the understanding that we priced it at cost plus and that the cost should be reduced as we became more efficient. This bargain was faithfully carried out on both sides, and led to a fifteen-year association between the two companies which will always be remembered with gratitude by Arrowsmiths.

In the event it was this speciality in mathematical composition that the company chose to pursue. In the early days the main problem was so to operate that the publisher customer could persuade the reluctant author to entrust his brain child to an unknown Bristol typesetter who was neither the Oxford nor the Cambridge University Press. However, with hindsight, it is possible to see that this particular difficulty was certain to be overcome eventually, for the simple reason that the University presses were so overwhelmed with work, and the number of mathematical papers to be published was so great, that sooner or later work would have to go to any typesetter who was prepared to lay himself out to accept it.



"Five hundred handbills, 'The hour is nigh, prepare to meet thy doom'—any particular rush?"

Direct-Mail Shot

Mathematical bookwork was attractive to the company because, as very few printers were prepared to undertake it, it commanded a higher price in the market, and in its small way placed us almost in a monopoly or rather oligopoly position. At the same time it exploited to the full the composing side of the company, which had always been its largest section and its main revenue earner. Now the 1955 decision to expand our sales of advertising literature and general jobbing had been taken simply because it had been believed that Arrowsmiths could not make bookwork pay, and that better prices were to be obtained from advertisers. The more, therefore, that we succeeded in mathematical bookwork the less attractive became the advertising work. In fact, bookwork came to dominate the composing section of the factory, while advertising work became more and more a diversion from the main stream of production and an interruption to it. The production of the Pergamon mathematical journals led us on to quote for others, and in 1961 we made a successful bid for the journal of the Institute of Physics, who are

still an important customer. However, there were definite limitations to the amount of mathematical work that was published each year, and it was clear that, in England alone, the scope of this market was limited.

But in 1959 there occurred the first full-scale strike in the industry since 1926, which stopped all production in the British printing trade for seven weeks. When work was resumed there was a tremendous backlog to catch up. At that time our London representative was calling on the London subsidiary of the American publishing company of Van Nostrand, and we were asked if we would undertake the production of two US titles which had been sent to their regular British typesetter but had been held up by the strike. We produced proofs and later reproduction pulls, and the customer was pleased with our work and paid our bills.

At that time there were two British printers who worked for US publishers on mathematical and technical composition, and it was known that quite large titles, in large numbers, were in production

there: it was said that the US typesetters, being unable to mechanize this sort of work, had less interest in it and that there was therefore room for foreign competition to operate. It would be fairer to say that the large element of handwork in this sort of work gave great competitive advantages to the supplier with the lower wage costs. Our success with two titles led us to believe that there was a place for us in the American market, and this was confirmed by a sales trip made in the Autumn of 1960, when some thirty potential customers were visited and our samples were encouragingly received. But an encouraging reception does not necessarily lead to orders, and as 1961 advanced it became clear that a much more vigorous sales drive would be necessary if significant results were to be achieved. One of our salesmen agreed to spend 12 months in America to give full-time representation in the market, and this was a considerable act both of courage and of disinterestedness, particularly as he was quite unused to bookwork and had it all to learn. He went out in February 1962, and by May we received our first composition order. By September the flow of work was more than we could handle. When the time came for him to leave, a permanent successor was found and sent out to replace him, but after a further year the successor left the company, and it was decided to discontinue the plan of permanent representation, and to service the customers by visits from Bristol; these are generally made three or four times yearly, with extra visits as necessary.

Since 1962 the American customers have provided a substantial part of the company's sales, until now (1979) it accounts for half of the output of our composition section. From 1962 to 1967 we sought orders only for books, but in 1967 a successful drive was launched to capture journal work from US journal publishers, and this has been a fruitful source of business. So far we have done very little printing for America, confining ourselves to composition only, save in the case of a few jobs, but this restriction, though blamed on the manufacturing clause of the US copyright act, is in fact both natural and in line with the demands of the market. British prices for technical composition remain lower than US ones, while in printing and binding we are much less competitive;

added to which is the relative cheapness of American paper and the adverse effect of the cost of transport across the Atlantic.

With the establishment of the American market the company's major interest became definitely the production of mathematical books and journals, and the sales development since then has been to specialize increasingly in this type of work and to relinquish contracts, of whatever antiquity and whatever sentimental interest, that conflicted with this aim or diverted the attention of managers from their main job. The Bristol-based salesmen were lost to us by retirement or by their own volition, and when the sales office was set up in 1965 a conscious decision was made no longer to accept small orders for stationery and the like that were still being sent to us, but to pass them on to specialists who could handle them better. In 1974, when our hot metal Monotype plant was finally closed, we were forced to relinquish our longest standing contracts, with British Railways and with Bristol University, which were respectively 100 and 75 years old.

Finally in 1978, we found that we were no longer able to give proper service to our label customer, John Harvey and Sons Ltd., our last remaining link with the 1955 edition of this book. The customer is now better served by specialist label printers, and our staff, both printing and label-punching, are better employed printing and binding books for our publisher customers.

The development of the Linotron composing system in 1974–1976, described below, had the effect of reducing the time taken to set mathematical pages, and therefore of increasing our capacity to handle this type of work. The simultaneous reduction in the value of the pound sterling has enabled us to extend our sales of technical composition to publishers in France and Holland, thanks to the linguistic ability of one of our salesforce, and the company in 1979 finds itself almost entirely specializing in the composition, printing, and paperback binding of educational books and scientific journals, though only about half our work is both set, printed and bound in-house.

The last twenty-five years of the company's life have thus seen a complete change of marketing emphasis, from the 'total service' philosophy of the

1950s to the very strict specialization of today. The decision to cease work for a valued and old-established customer is not an easy one, and we have made it a principle, on such occasions, to seek out a competitor who will be willing to assume in our place the responsibility that a supplier has to his customers. If the decision to specialize is a hard one, it has nonetheless proved to be correct, at least on most occasions, and certainly the gain of efficiency at both administrative and workshop level has been of incalculable advantage. Life is less interesting now

than it used to be, because there are few special jobs nowadays and few rush jobs, but the lack of variety enables us to concentrate on getting the very best out of our specialized equipment and to reach levels of productivity and delivery achievement which were unheard of under the old dispensation. For the future as in the past we firmly intend to concentrate on our customers' long-term needs, and to adapt our management methods and our technology as these requirements alter in the future.

Chapter Eight

Methods of Working

IN 1954 we were a general-purpose letterpress house: new matter was set by Monotype, a large case room handled both standing type and new composition, we printed by letterpress on mainly Miehle machines, and our bindery was laid out for folding and saddle-stitching, with some ancillary equipment. For the next eight years we aimed at improvements within this framework.

On the printing side we slowly replaced our old machines with new ones, and concentrated on reducing makeready by the development of a premakeready section and by the introduction of an improved type of blanket. Our composing room was strengthened by the purchase of further Monotype

keyboards and casting machines, large proof presses and equipment. But the technology of composition was almost static, and our only breakthrough was the development, by our own staff, of the three-line system of setting mathematics.

The main problem of mathematical composition is posed by the necessity to display equations over two or more lines of type. The traditional method was for the compositors to do this by hand at the case, using an 11-point bodyface with a 2-point rule or lead to build up a two-line fraction of $11 + 11 + 2 = 24$ points, the equivalent of two lines of 12 points (page 40). Any attempt to do this mechanically produced a fraction with an unacceptable amount of white space between

By the Parseval theorem for χ_1 -transforms of $L^2(0, \infty)$

$$\int_0^\infty \left\| \sum_{1 \leq n \leq x} a_n - R_0(x) \right\|^2 x^{-\frac{1}{2}(\beta+1)} \left\{ \frac{1}{2}(\beta-1) |f(x) - xf'(x)| \right\} dx$$

$$= \int_0^\infty \left\| \sum_{1 \leq n \leq x} a_n - R_0(x) \right\|^2 x^{-\frac{1}{2}(\beta+1)} \left\{ \frac{1}{2}(\beta-1) |g(x) - xg'(x)| \right\} dx \quad (5.1)$$

The left-hand side is

$$= \int_0^\infty \left\| \sum_{1 \leq n \leq x} a_n - R_0(x) \right\|^2 \frac{d}{dx} \{ x^{-\frac{1}{2}(\beta-1)} f(x) \} dx$$

$$= - \left(\left\| \sum_{1 \leq n \leq x} a_n - R_0(x) \right\|^2 x^{-\frac{1}{2}(\beta-1)} f(x) \right) \Big|_0^\infty + \int_0^\infty x^{-\frac{1}{2}(\beta-1)} f(x) d \left\| \sum_{1 \leq n \leq x} a_n - R_0(x) \right\|^2$$

$$= O\{x^{\frac{1}{2}} f(x)\} \Big|_0^\infty + \lim_{N \rightarrow \infty} \int_0^N x^{-\frac{1}{2}(\beta-1)} f(x) d \left\| \sum_{1 \leq n \leq x} a_n - R_0(x) \right\|^2$$

$$= \lim_{N \rightarrow \infty} \left(\sum_{n=1}^N a_n n^{-\frac{1}{2}(\beta-1)} f(n) - \int_0^N x^{-\frac{1}{2}(\beta-1)} f(x) dR_0(x) \right).$$

Displayed Mathematics set by hand

numerator and fraction bar, and between fraction bar and denominator.

By the early fifties the University of Toronto Press had succeeded in mechanizing the process by keying and casting a 10-point face on a 6-point body: a two-line fraction of 24 points in depth required four lines of 6-point, i.e. numerator, blank, line of em rules, denominator. From a paper they published we worked out a system of setting a 10-point face on an 8-point body, and were able in this way to mechanize almost entirely the laborious hand process of mathematical composition (page 41). The Monotype Corporation's four-line system, basically Toronto's four 6-point lines, was made available to the trade a few years after we had perfected our three-line system, but since it offered no advantage we declined to purchase it.

However the Monotype Corporation were by now also marketing their Monophoto system, and, being aware of the potentiality of mathematical composition, were willing to co-operate with us in adapting their four-line system for film setting. In 1962 we

bought our first Monophoto filmsetter, soon to be followed by four more, and began a long period of transition from hot metal to film composition, a period which was to last until 1974. Filmsetting brought with it the necessity to master a host of new problems, choice of film, choice of adhesive, proofing processes, control of film densities, but its value can be judged by the fact that in 1977 we were producing seventy-five percent more pages than in 1961, but employing thirty-three compositors in the make-up section instead of the 1961 figure of sixty-three working at the case or stone.

We felt the freer to experiment with filmsetting because of our sales to America, which were of composition only and did not involve printing. But by 1965, when we had realised the advantages of filmsetting, we decided to install an offset press so that we should at least be able to print from our own film. It was three years before our first machine was fully operational, but we added a second machine almost at that time, and in 1975 a third. Here again we had whole new fields to discover, not only on the printing

Example 1

Line A	$u_1(x) = \int_0^\pi \left(\frac{d_p}{d\Omega} \right) - \sum_{p=1}^d [p_L(r) + i\Phi r^2] i_\pi e^2 K \left(\frac{1}{2\pi} K_0 \right) .$	} 8 pt	} 24 pt
Line B		} 8 pt	
Line C		} 8 pt	

Example 2

Line A	$u_1(x) = \int_0^\pi \left(\frac{d_p}{d\Omega} \right) - \sum_{p=1}^d [p_L(r) + i\Phi r^2] i_\pi e^2 K \left(\frac{1}{2\pi} K_0 \right) .$	} 8 pt	} 24 pt
Line B		} 8 pt	
Line C		} 8 pt	

Example 3

$$u_1(x) = \int_0^\pi \left(\frac{d_p}{d\Omega} \right) - \sum_{p=1}^d [p_L(r) + i\Phi r^2] i_\pi e^2 K \left(\frac{1}{2\pi} K_0 \right) . \quad \text{As printed}$$

Displayed Mathematics set by machine 1955

but also on the platemaking side, but we were fortunate that the pace of technological change was now hotting up, both in filmsetting and in offset printing, and the number of new materials and new gadgets that have become available during the sixties and seventies have proved stimulating to those who use them and beneficial to our prices.

The change to Monophoto filmsetting improved the quality of our composition to a much greater degree than we had expected; it also improved our productivity, but not quite so much as we had hoped: by 1970 it was clear that computer-assisted composition offered big productivity improvements, and we took the opportunity of a government-assisted consultancy scheme to commission, in conjunction with the Pitman Press, a detailed investigation of the possibility of using computers to help in the composition of mathematics. This detailed desk study taught us a great deal about the advantages and the problems of computers, and enabled us to make remarkably accurate plans for installation when in 1973 Linotype Paul offered to

the trade their Linotron 505 machine with a program written for the setting of mathematics.

Our first Linotron was installed in January 1974, its program for mathematical setting in January 1975, and our second Linotron, more necessary as a back-up machine than for true production, in the spring of 1976. In September 1974 we held an auction sale of our hot-metal composing installation, and it was a sad occasion to see first-rate equipment, that we had pinched and scraped to purchase, being sold for next to nothing because it was now obsolete. On the other hand, we sold our type metal advantageously, and to some extent alleviated the financial strain of re-equipment.

The ending of composition by type meant the ending of our letterpress book printing, and, in the same year that we were retraining our last hot-metal compositors for film, we were also retraining our letterpress minders for offset. The consequent loss of capacity, whilst retraining was taking place, put us under considerable financial pressure which lasted until the end of 1976. However, the strain was also a

stimulus to do better, and, by force of circumstance, we considerably improved our stock turnover and credit periods during those years.

Just as the pace of technological change is accelerating in the offset section, so in the composing room the new system lends itself to small but significant improvements, in the program, in the use of Visual Display Units, in the use of magnetic in place of paper tape, and, again as in the machine section, our staff have been stimulated and encouraged by the new prospects before them, and our customers, under competition, have had the benefit of low prices. The older ones amongst us find it a far cry from the old hot-metal days, but the

younger ones take it as a matter of course and seem ready to exploit the changes to the full.

We are now able to quantify the effects of the change from Monophoto and Monotype to Linotron setting. At the end of 1973 we had 24 Monophoto and 8 Monotype keyboard operators, with a total composition staff of 116. At the end of 1976 we had the same 32 operators, a total composition staff of 99, and our output of pages increased by one third: our capital expenditure, on composition plant alone, was £350,000, but we also sacrificed three years' profits which we hope to make up in the future. We agreed early retirement with four senior compositors, but apart from this no-one was made redundant.

Chapter Nine

Domestic Affairs – Two

IN THE 1955 edition of this history, the chapter on Domestic Affairs begins with the wise observation that 'Any business is a living organization of the men and women who find their livelihoods in it': it goes on to describe various aspects of business and social life within the company at that time, and in this continuation chapter their development since 1954 will be described.

The last 25 years have seen great advances in British industrial management, and Arrowsmiths have played their part in improving methods of work handling and work organization. In pre-war years, when the company was smaller and pressure of work was less, jobs were estimated, scheduled and

processed through the factory by the Composing Room Manager, who was in fact the Works Manager. During the 1950s, as the company expanded and work measurement exposed the inefficiency of work shortages, we set up a production control section and were feeling our way towards a more centralized work handling system. But with eight salesmen, each wanting their own job done first, the central control tended to break down, with bad effects on our customers and on management morale. When the US work started to reach us in quantity, in the early 1960s, the US publishers expected of us a much higher standard of service, indeed of personal attention, than we were



Arrowsmith Float at Bristol Charter Celebrations 1977

capable of giving. This led in 1965 to the establishment of a Sales Office, with a formalized structure of account executives each of whom was personally responsible for all the work of the customers assigned to him. As work has grown and customers become more demanding, so the number of account executives has been increased to its present number of eight.

The work measurement scheme, installed 1950-1951, was described in the 1955 edition in terms

rather more glowing than, in retrospect, we should apply to it. However, it achieved two things despite its faults: it raised wages very considerably above the local and indeed national average, and it forced on management's notice the dangers of an empty orderbook and of operational inefficiencies. By the end of the sixties, after nearly twenty years of operation, it was clearly in need of drastic revision, and in 1973 a joint management-chapel scheme was introduced to replace it, which by securing stability of

earnings for employees enabled management the more freely to introduce the big technological changes which were in prospect. After six years' operation, the revised scheme can be said to be functioning well and to have secured the objects that it was designed to achieve.

If in the last decade the wages of other printers have tended to catch up on ours, the company's high wage structure has made possible a number of desirable social developments since 1954. Our pension scheme has been fundamentally altered three times: in 1956 when we abandoned the non-contributory principle, in 1968 when for the first time we faced up to the effects of inflation on pensions, and in 1978 when we decided to contract out of the 1978 government pension plan. These developments would not have been possible without substantial employee contributions, which, in the circumstances, employees have been ready to give and management justified in asking for.

The annual outing has not survived the rising standards of living of the fifties and sixties: the last outing as such was held in 1962. But the social life of the company has been transformed by the establishment in 1957 of the Sports and Social Club, which depends for its existence on the subscriptions of its voluntary members, with some small support from the Company. All members contribute a modest weekly subscription, and are in return entitled to support from the Club for whatever sporting or social activity they wish to undertake. In 1979 the clubs dependent on it include angling, cricket, and fives football; it also runs an annual dinner-dance, a party for younger children and a pantomime for older children, with various similar entertainments. The activities of the Club are organized entirely by the voluntary officers, on whose enthusiasm the success of the whole

depends; during the twenty odd years of its life the officers change but the enthusiasm remains. When the 500th anniversary of Bristol's charter was celebrated in 1977, a party of volunteers erected and manned an Arrowsmith float (page 44), and won a distinction against professional competition.

In February 1978 advantage was taken of a provision of the current government Pay Policy to take upon the company's shoulders the responsibility for seeing that employees suffered no financial loss when absent for sickness. During the same year, a profit-sharing scheme was similarly introduced, with the aim of enabling our employees to participate in any financial advantages that the new technology might bring and that our customers might leave with us.

The 1955 edition was written just as we were moving to our present factory, which had been the object of so many hopes, so often disappointed. With hindsight, we can see that the sawtooth roof is out of date, costly in fuel, and too hot in summer, and that modern transport has developed in such a way that our loading dock was obsolete before it was used. But the great virtue of our building has been that its designer foresaw that requirements would change, and resisted the temptation to make a factory purpose-built for the 1950s. The result has been that, with additions in 1959 and 1969, the present building has been quite easily adapted to the very different requirements of the 1970s. The latest 1979 addition gives us 7500 feet of office-type space, free of the disadvantages of the sawtooth roof, better suited to the needs of present-day compositors and freeing for manufacturing and storage purposes one fifth of the original factory area. The enlarged building (page 47) has enabled us to effect a long-needed tidying up operation, so that our production area has been completely rearranged to fit the completely new technology of today.

Conclusion

DURING its century and a quarter of existence the exact progress of the company's growth is unknown for the earlier years. From page 28 we see that at its foundation it employed twelve people, and this is confirmed by old wage books in the company's possession. Under J. W. Arrowsmith the company expanded considerably in size, as is shown by the purchase of the Small Street building which doubled the area of the premises occupied. By 1913 there were ten printing machines of double crown to quad royal size, and it is believed that in the

twenties and thirties the numbers employed in the summer months totalled about one hundred. In the winter months this figure would drop to about seventy, owing to the seasonal nature of the work handled.

Definitely in 1947 we employed one hundred people, and this figure remained constant until the move in 1954, for the simple reason that there was no room for more to work. During the second half of the 1950s employment increased reaching 199 in 1962, a peak of 266 in 1970, and declining to 204 in 1977 as

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productivity rose under the influence of the new technology. Our current aim is once more to expand our direct labour force while holding our administration constant, and at the time of printing (1979) our employees number 215.

The company is independent, and intends to remain so. The company Chairman of 1954, Dick Brown, retired in 1972, and died all too soon afterwards, a tragically short retirement after a lifetime of hard work. He was succeeded by his cousin Henry Arrowsmith-Brown, whose own approaching

retirement, and peace of mind therein, has been assured by the presence in the company of his elder children Victoria and James, the great-great-grandchildren of Isaac Arrowsmith the company's founder.

We know that we put the customers' interests first, that we can digest whatever technological changes the future may bring, in short that the future holds no terrors for us. As in 1954 so in 1979, we cordially invite our friends to visit us at Winterstoke Road and see for themselves how we manage our affairs.

